Sequential Containers Solutions

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Sequential Containers

- Briefly describe the general features of the array-like containers in the C++ standard library
  - Data is stored in a contiguous memory block (or blocks, for std::deque)
  - Data is stored in an order which is determined by the program
  - We can access an element by using an index which is related to the position of the element in the container
  - Accessing any element takes the same amount of time, regardless of its value or position in the container
  - Adding or removing elements will usually involve moving data around inside the container and may require reallocating the internal memory block

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List-like Containers

- Briefly describe the general features of std::list
  - Each element is stored in its own node
  - Implemented as a double-linked list, in which each node has a pointer to the previous node and to the node which follows it
  - Does not support indexing
  - Accessing any element requires iterating one node at a time until the desired node is reached
  - The time taken to access an element depends on the number of intervening elements
  - Adding or removing elements always takes the same time. Except for the two neighbouring nodes, no other elements are affected

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std::deque

- Briefly describe how std::deque differs from std::vector
  - Has multiple internal memory blocks instead of a single one
  - Supports push_front() as well as push_back()

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Deque example

- Write a program which
  - Creates a deque of int
  - Adds some values to it, at both the front and the back, then displays the number of elements
  - Sorts the deque
  - Finds an element with a given value and inserts a new element before it
  - Removes the first element
  - Clears the deque and displays the number of elements
- After each operation, display all the elements of the deque

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List example

- Write a program which
  - Creates a list of int
  - Adds some values to it, at both the front and the back, then displays the number of elements
  - Sorts the list
  - Finds an element with a given value and inserts a new element before it
  - Removes the first element
  - Clears the list and displays the number of elements
- After each operation, display all the elements of the list

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